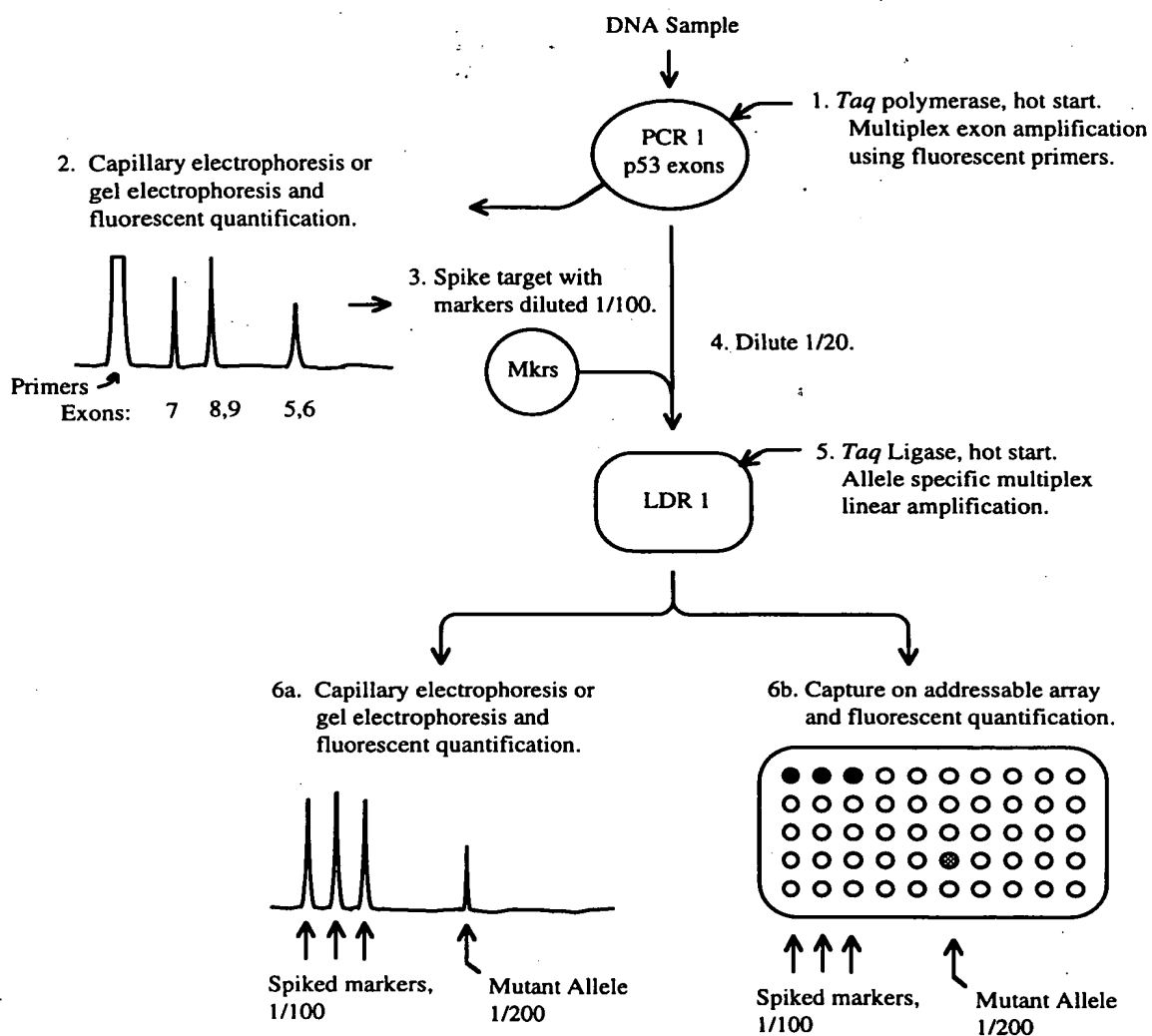
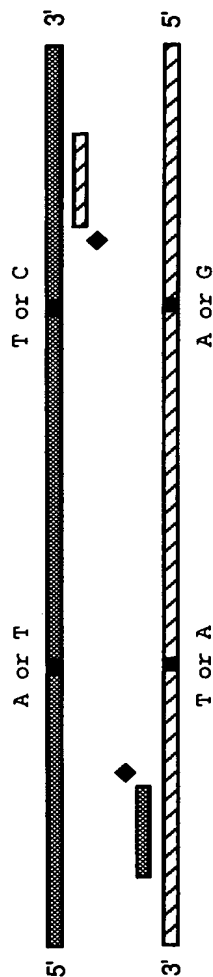


**FIG. 1**

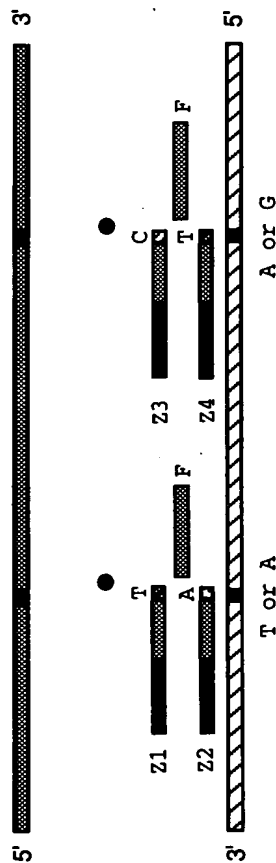
**FIG. 2**

**PCR/LDR**

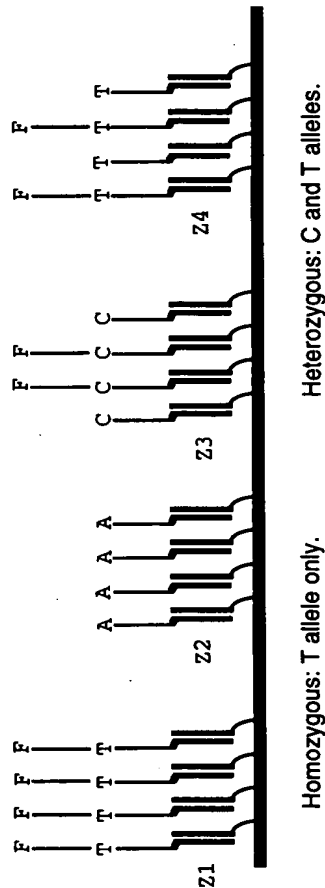
1. PCR amplify region(s) containing mutations using primers, dNTPs and *Taq* polymerase. ◆



2. Perform LDR using allele-specific LDR primers and thermostable ligase. ●  
Allele specific oligonucleotides ligate to common oligonucleotides only when there is perfect complementarity at the junction.

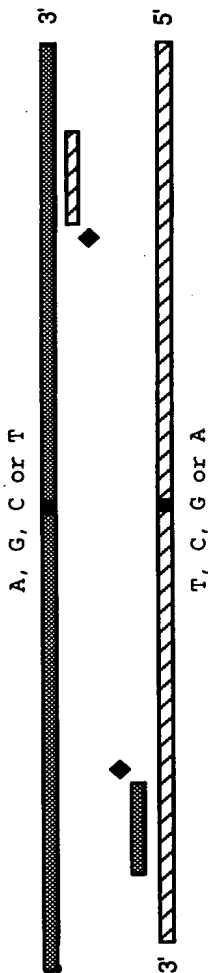


3. Capture fluorescent products on addressable array and quantify each allele.

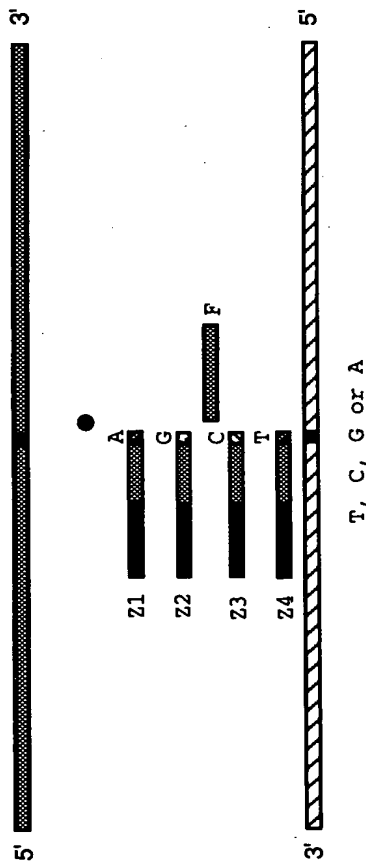
**FIG. 3**

# PCR/ LDR

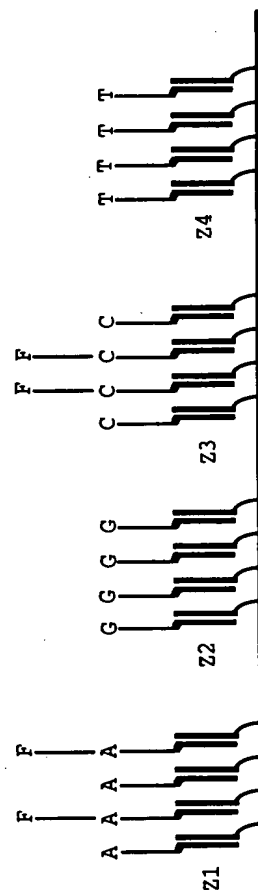
1. PCR amplify region(s) containing mutations using primers, dNTPs and *Taq* polymerase. ◆



2. Perform LDR using allele-specific LDR primers and thermostable ligase. ●  
Allele specific oligonucleotides ligate to common oligonucleotides only when there is perfect complementarity at the junction.



3. Capture fluorescent products on addressable array and quantify each allele.



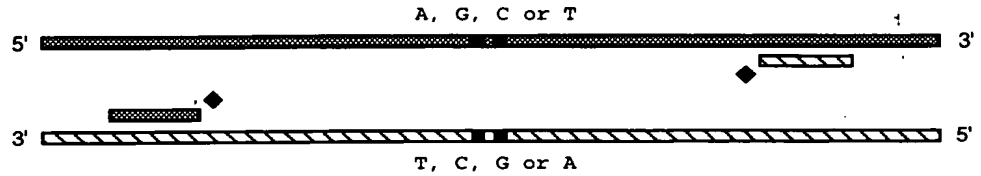
Heterozygous: A and C alleles.

FIG. 4

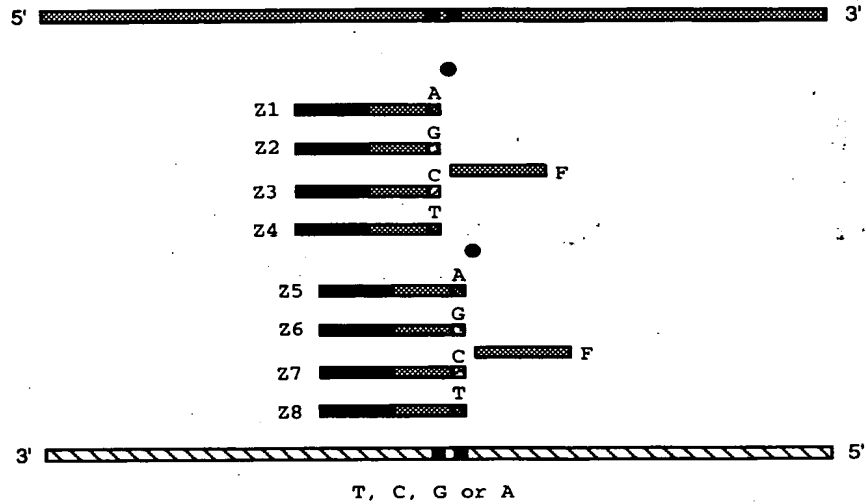
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# PCR/ LDR : Nearby alleles

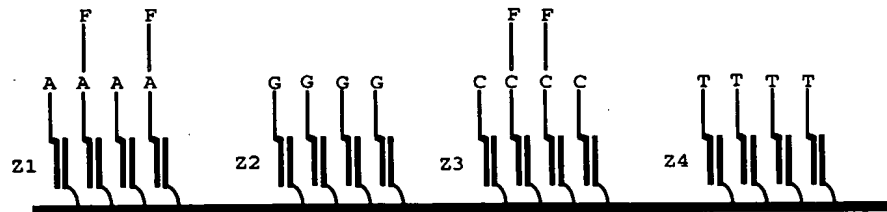
1. PCR amplify region(s) containing mutations using primers, dNTPs and *Taq* polymerase.◆



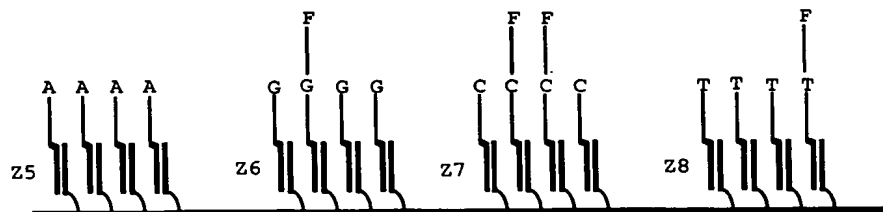
2. Perform LDR using allele-specific LDR primers and thermostable ligase.●  
Allele specific oligonucleotides ligate to common oligonucleotides only when there is perfect complementarity at the junction.



3. Capture fluorescent products on addressable array and quantify each allele.



Heterozygous: A and C alleles.



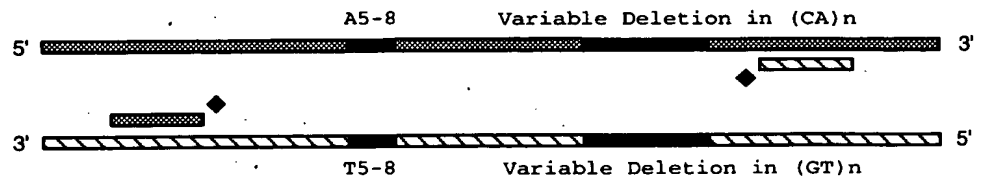
Heterozygous: G,C, and T alleles.

**FIG. 5**

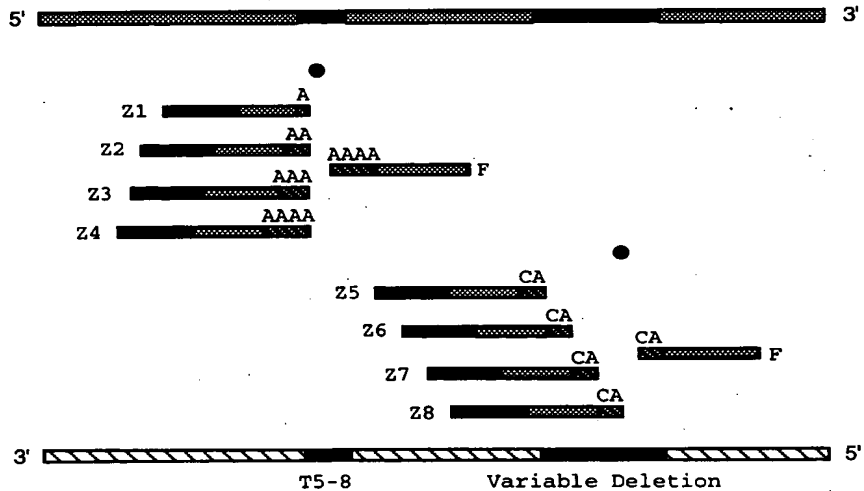
T09260"8693660

**PCR/ LDR : Insertions and Deletions**

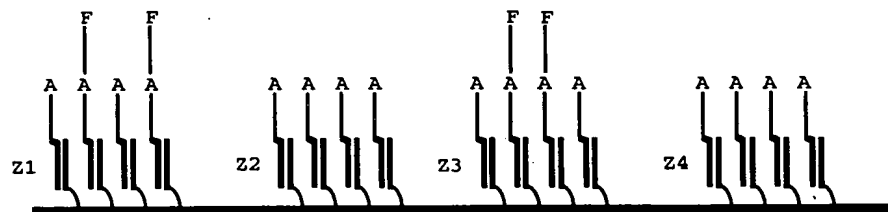
1. PCR amplify region(s) containing mutations using primers, dNTPs and *Taq* polymerase. ◆



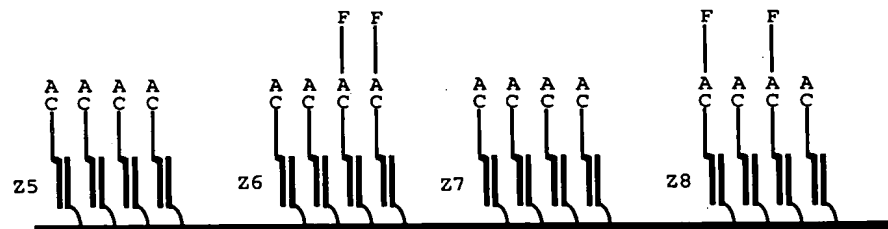
2. Perform LDR using allele-specific LDR primers and thermostable ligase. ●  
Allele specific oligonucleotides ligate to common oligonucleotides only when there is perfect complementarity at the junction.



3. Capture fluorescent products on addressable array and quantify each allele.



Heterozygous: A5 and A7 alleles.

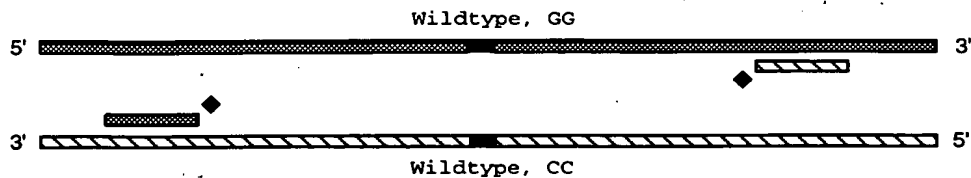


Heterozygous: (CA)5 and (CA)3 alleles.

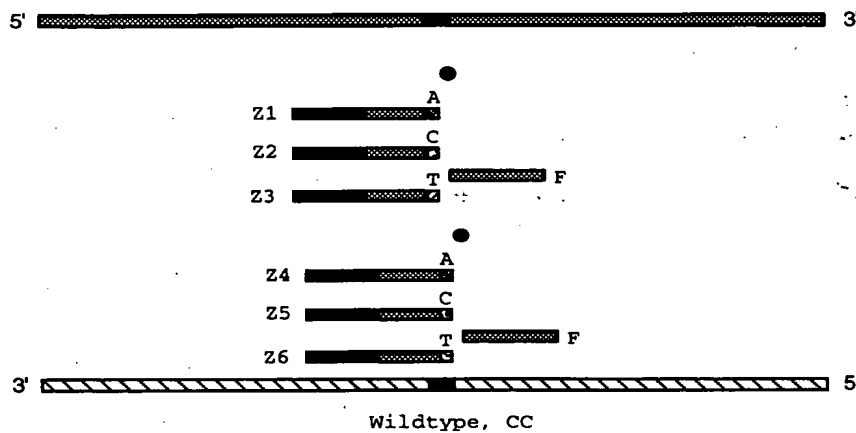
**FIG. 6**

**PCR/ LDR : Adjacent alleles, cancer detection**

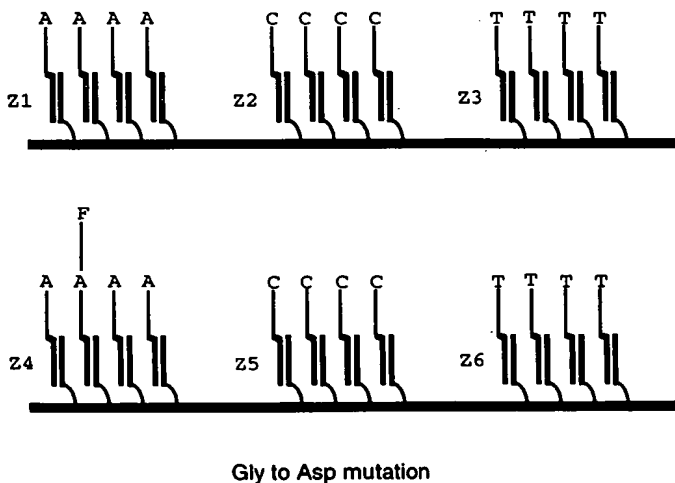
1. PCR amplify region(s) containing mutations using primers, dNTPs and *Taq* polymerase. ◆



2. Perform LDR using allele-specific LDR primers and thermostable ligase. ●  
 Allele specific oligonucleotides ligate to common oligonucleotides only when there is perfect complementarity at the junction.

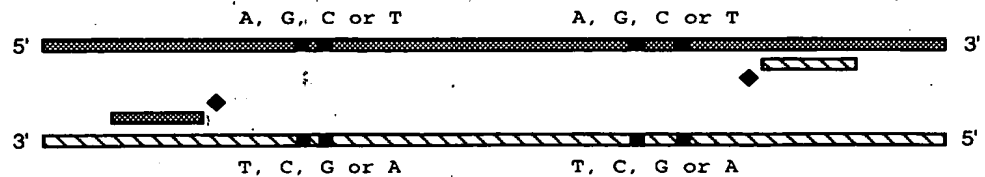


3. Capture fluorescent products on addressable array and quantify each allele.

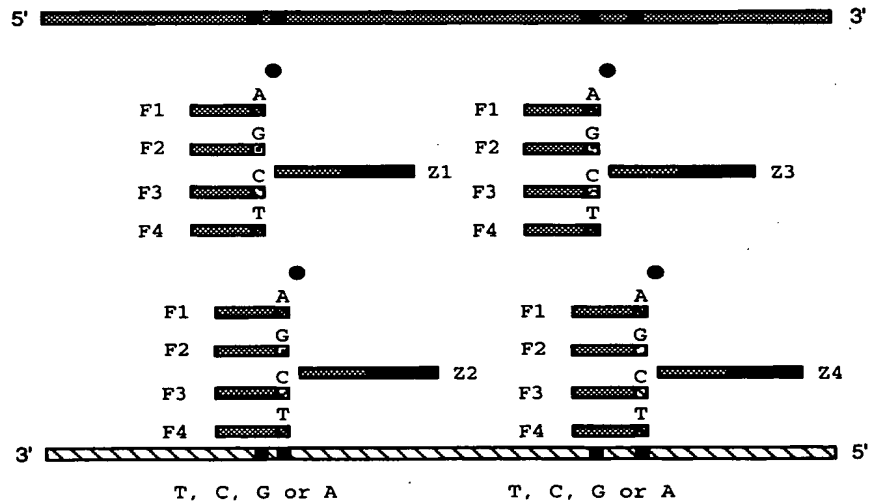
**FIG. 7**

**PCR/ LDR : Nearby alleles**

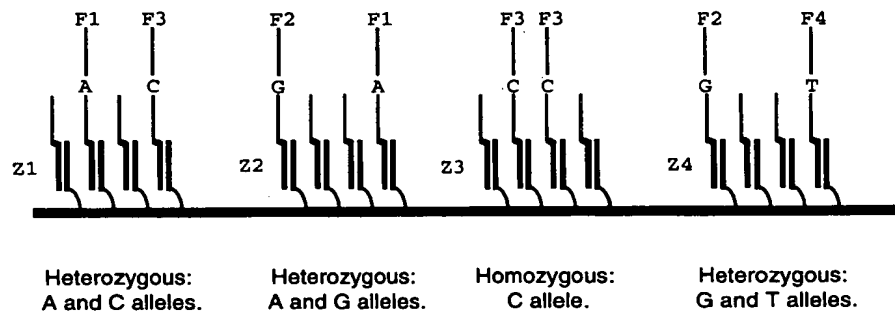
1. PCR amplify region(s) containing mutations using primers, dNTPs and *Taq* polymerase. ◆



2. Perform LDR using allele-specific LDR primers and thermostable ligase. ●  
Allele specific oligonucleotides ligate to common oligonucleotides only when there is perfect complementarity at the junction.



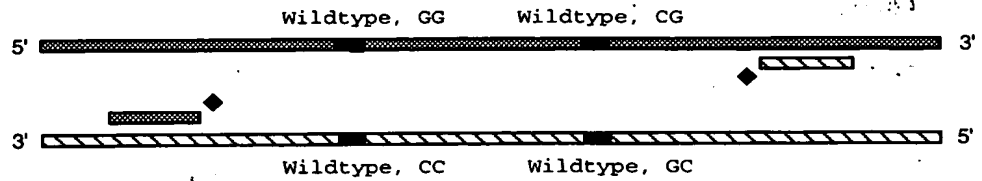
3. Capture fluorescent products on addressable array and quantify each allele.

**FIG. 8**

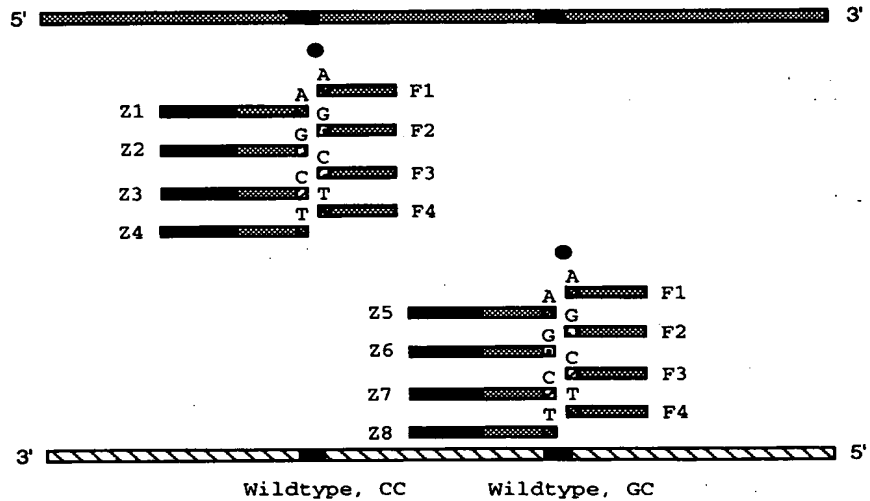
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# PCR/ LDR : Adjacent and Nearby alleles

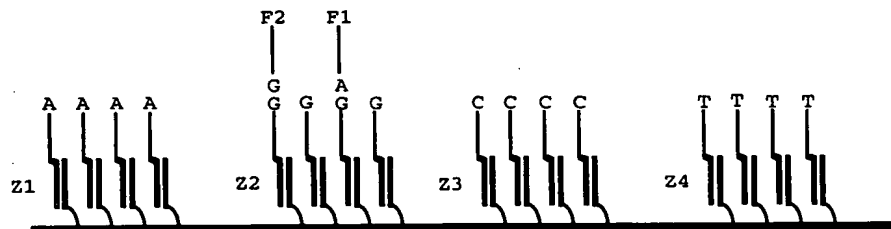
1. PCR amplify region(s) containing mutations using primers, dNTPs and *Taq* polymerase. ◆



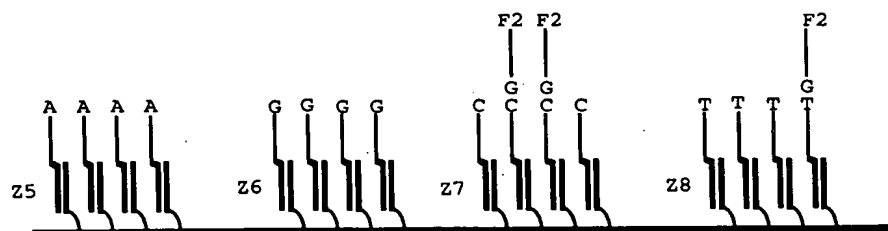
2. Perform LDR using allele-specific LDR primers and thermostable ligase. ●  
Allele specific oligonucleotides ligate to common oligonucleotides only when there is perfect complementarity at the junction.



3. Capture fluorescent products on addressable array and quantify each allele.



Heterozygous: Gly and Glu alleles.



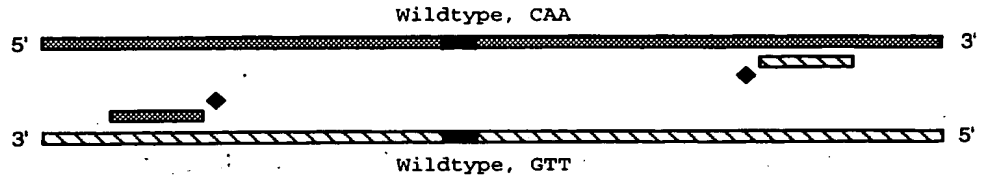
Heterozygous: Arg and Trp alleles.

**FIG. 9**

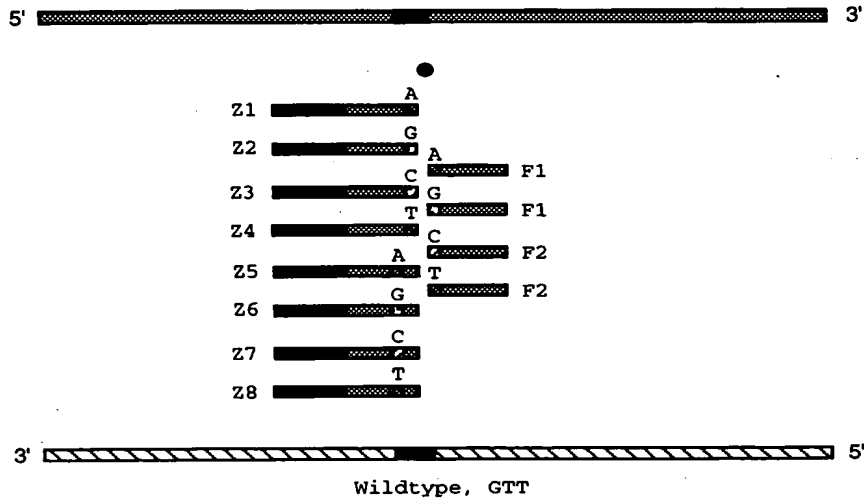
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# PCR/ LDR : All alleles of a single codon

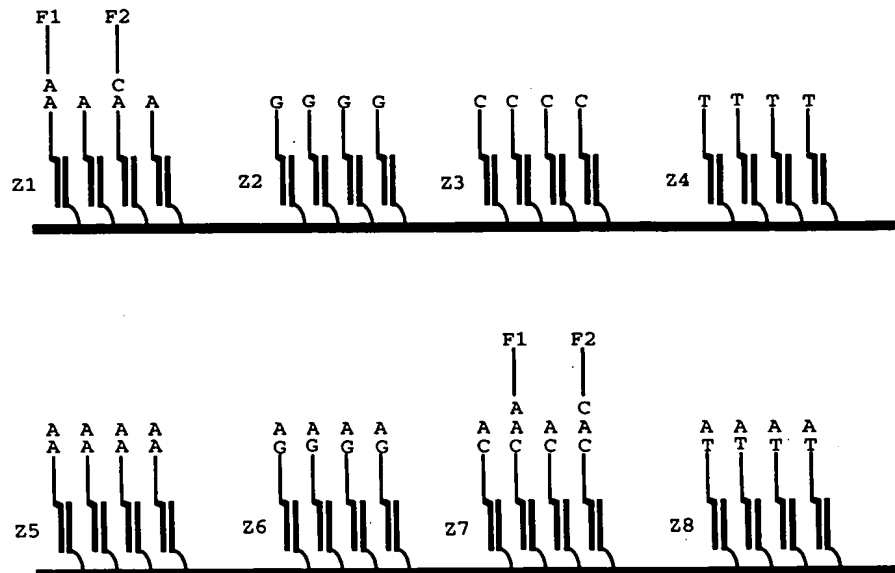
1. PCR amplify region(s) containing mutations using primers, dNTPs and Taq polymerase. ◆



2. Perform LDR using allele-specific LDR primers and thermostable ligase. ●  
Allele specific oligonucleotides ligate to common oligonucleotides only when there is perfect complementarity at the junction.



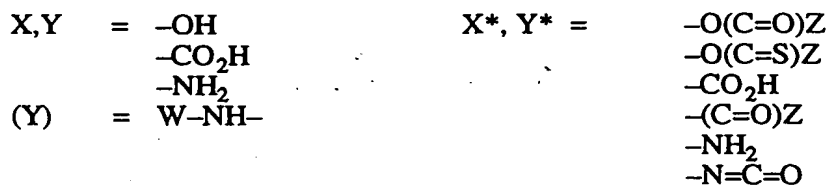
3. Capture fluorescent products on addressable array and quantify each allele.



Heterozygous: Gln and His alleles.

**FIG. 10**

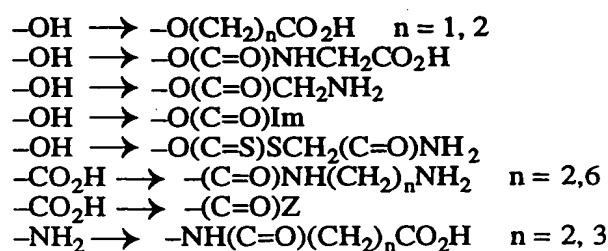
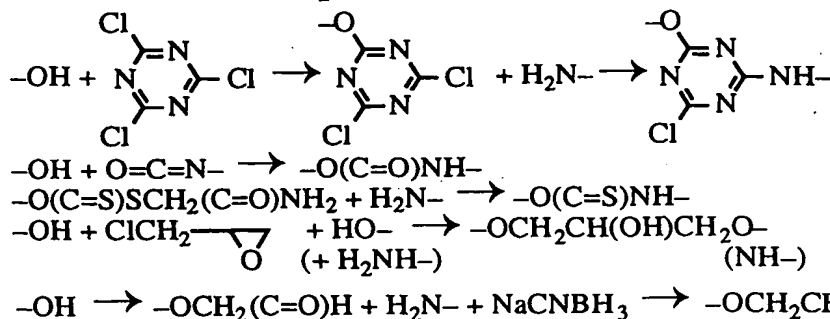
099660" 2692960



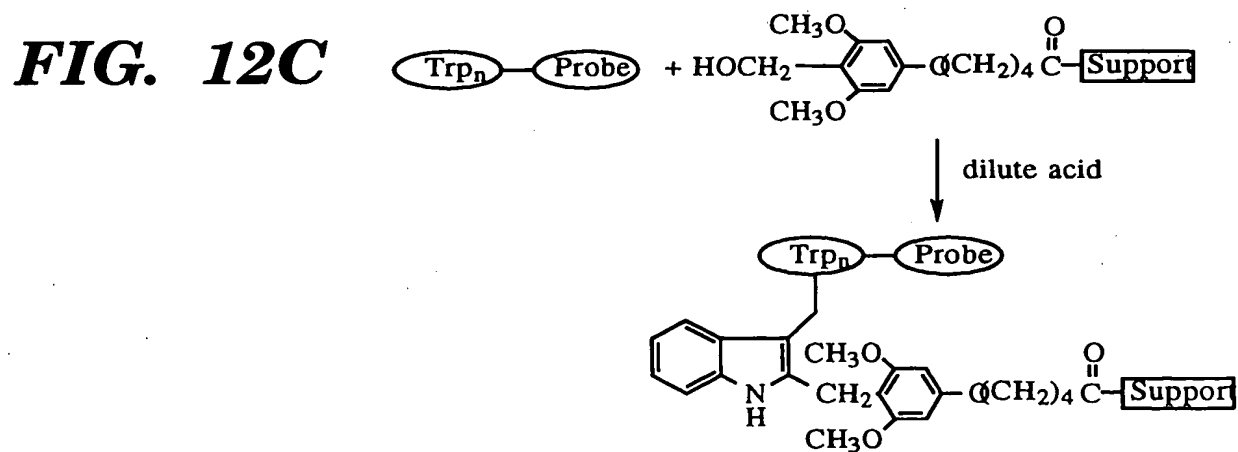
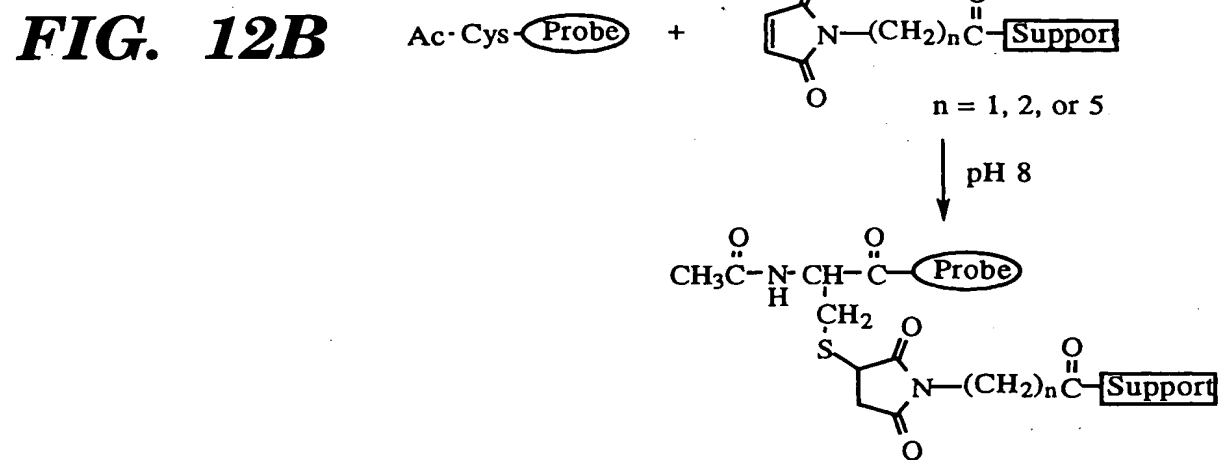
Z = activating group, e.g. imidazole (Im), *p*-nitrophenol (OPnp), hydroxysuccinimide (OSu), pentafluorophenol (OPfp)

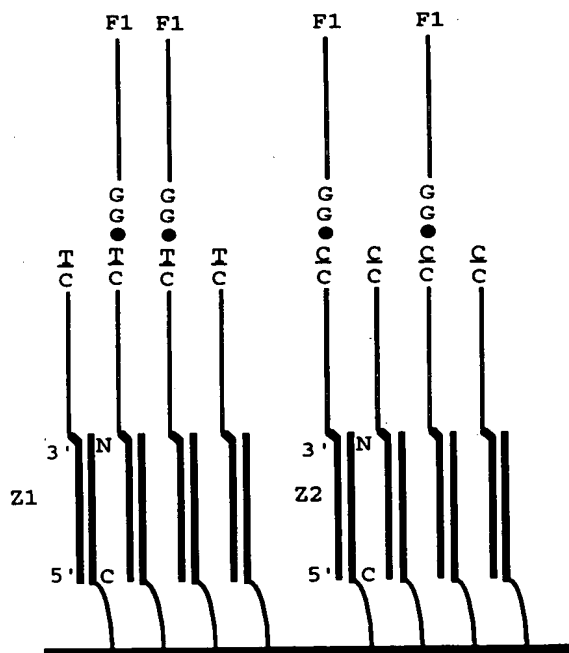
PEG = oligo or poly(ethylene glycol), backbone  $(\text{CH}_2\text{CH}_2\text{O})_n$   $n = 6$  to 200  
(can also be grown by anionic polymerization with  $\nabla$ )

**Functional group transformations/activation (as needed),  $X \rightarrow X^*$ ,  $Y \rightarrow Y^*$**

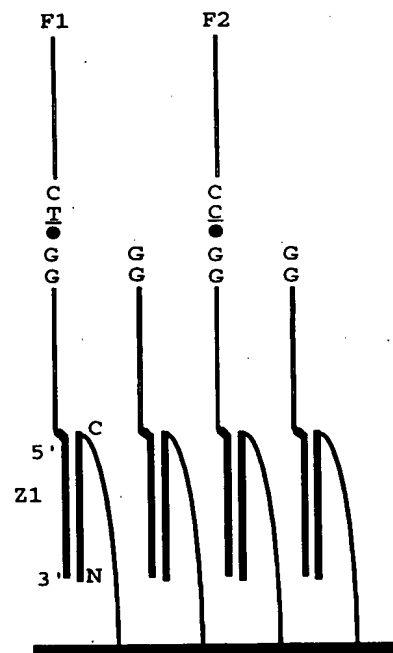

$$\begin{array}{l} -\text{CO}_2\text{H} + \text{H}_2\text{N}- + \text{WSC} + \text{HOSu} \rightarrow -(\text{C}=\text{O})\text{NH}- \\ -\text{OH} + \text{Im}(\text{C}=\text{O})\text{Im} + \text{H}_2\text{N}- \rightarrow -\text{O}(\text{C}=\text{O})\text{NH}- \end{array}$$


**FIG. 11**

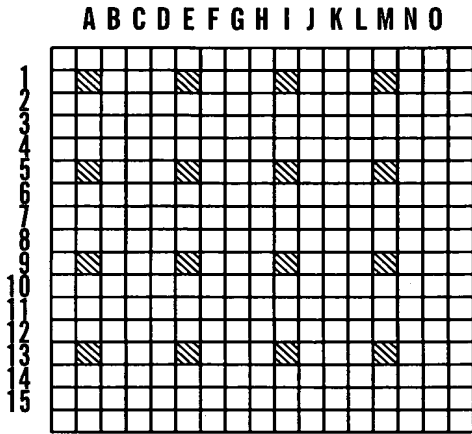




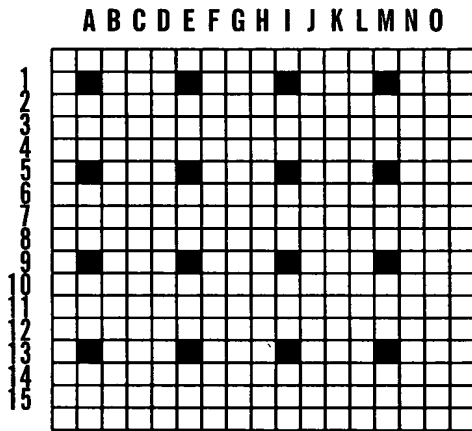
**FIG. 13B**



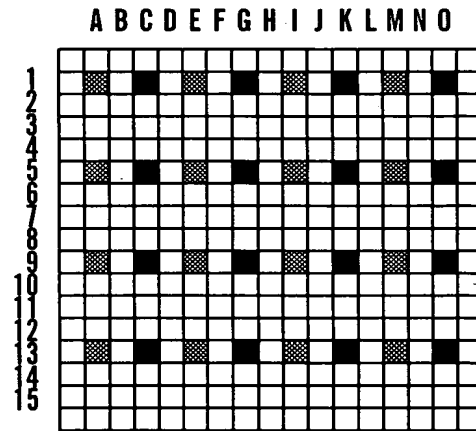
**FIG. 13C**



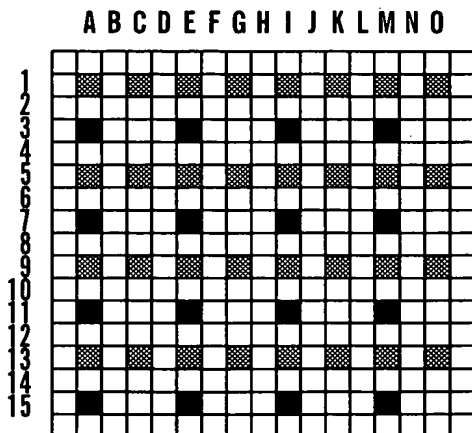
**FIG. 14A**



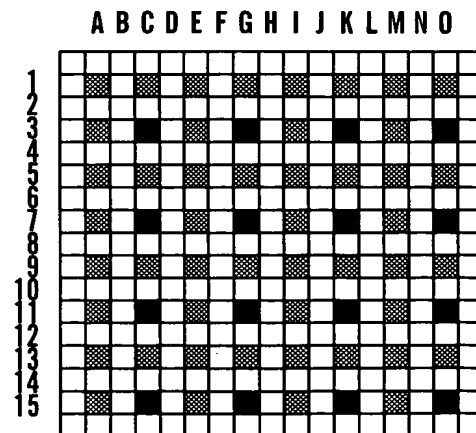
**FIG. 14B**



**FIG. 14C**



**FIG. 14D**

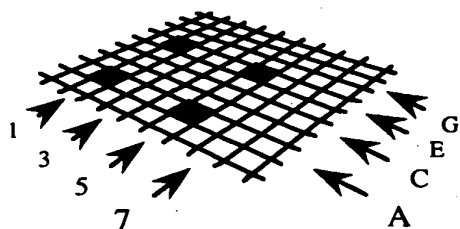


**FIG. 14E**

109250 2699660

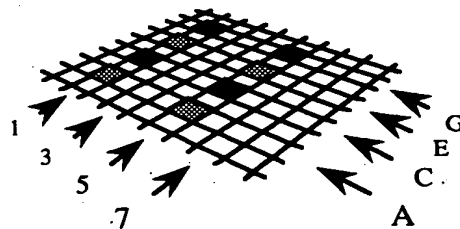
**FIG. 15A**

1st addition of unique 24mers.



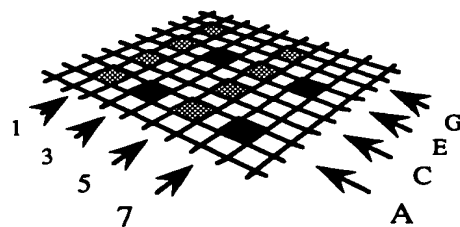
**FIG. 15B**

2nd addition of unique 24mers.



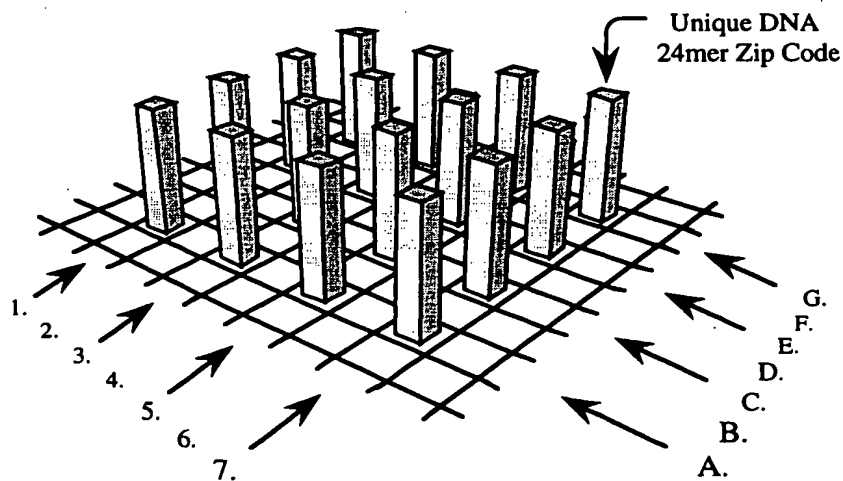
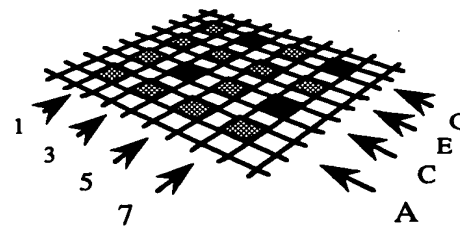
**FIG. 15C**

3rd addition of unique 24mers.



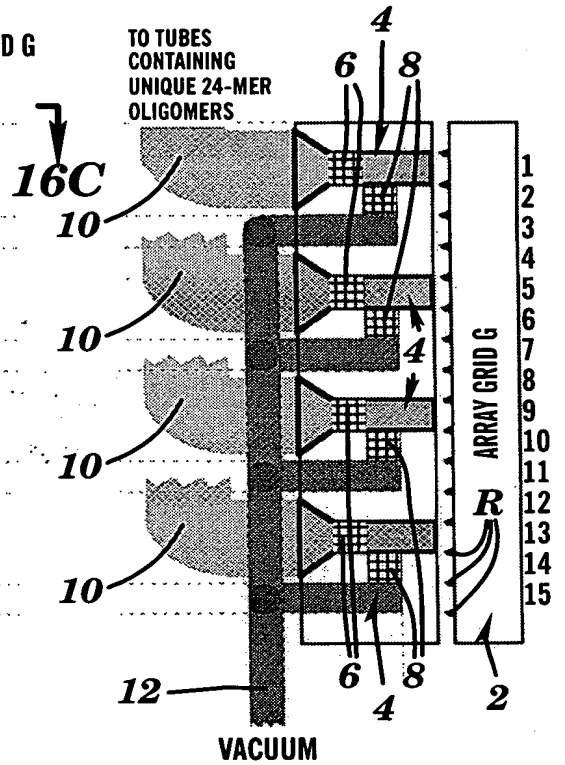
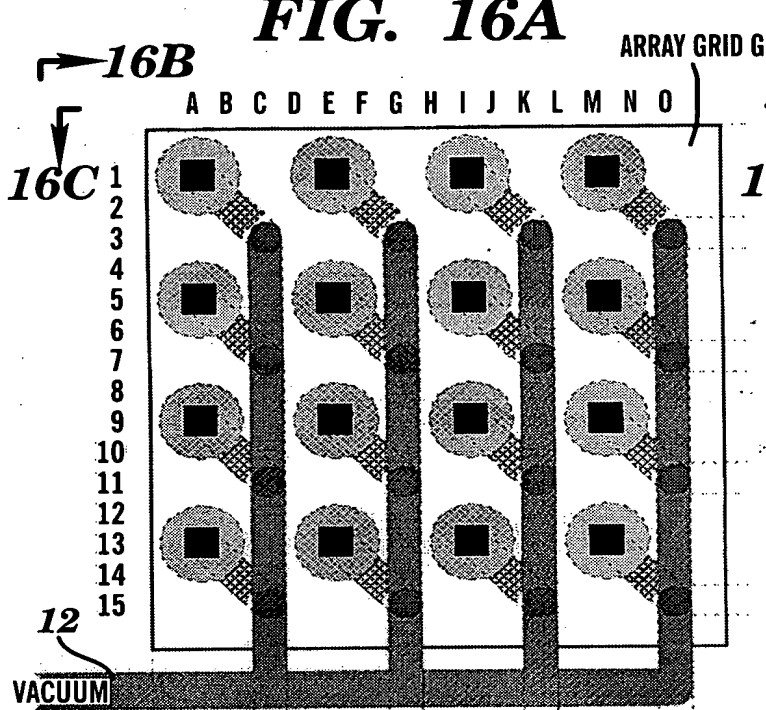
**FIG. 15D**

4th addition of unique 24mers.

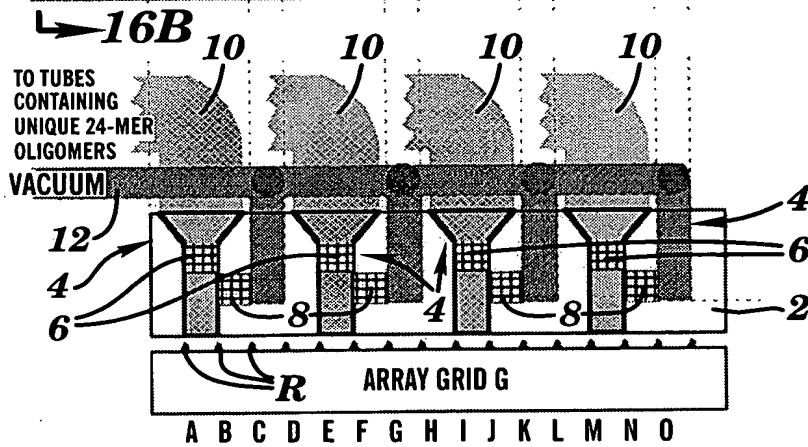


**FIG. 15E**

**FIG. 16A**



**FIG. 16B**



**FIG. 16C**

1ST TWO BASES → 2ND TWO BASES

	TT	TC	TG	TA	CT	CC	CG	CA	GT	GC	GG	GA	AT	AC	AG	AA
TT							16'			23'		TTGA 6			TTAG 8	
TC			TCTG 1		30'	TCCC 3			TCGT 5							6'
TG		TGTC 2		36'			TGCG 4						TGAT 7		11'	
TA						18'		TACA 36			33'					
CT	32'		CTTG 9					CTCA 11	CTGT 13							8'
CC				CCTA 33					29'				CCAT 15			
CG	CGTT 10		12'					4'					28'			CGAA 16
CA		34'			25'		CAGC 12			CAGC 14		1'			9'	
GT					GTCT 19	24'				GTGC 22			31'			
GC	CGTT 17		14'											22'		GCAA 23
GG		20'		GGTA 18	35'							3'		GGAC 24		
GA			GATG 34			GACC 20		2'	GAGT 21							
AT						ATCG 28	7'				15'			ATAC 31		
AC		21'			ACCT 27					ACGG 29	5'				13'	
AG			AGTG 25			AGCC 35			27'			AGGA 30		19'		
AA		AATC 26					10'			17'					AAAG 32	

FIG. 17

**1st Tetramer addition  
(columns)**

**2nd Tetramer addition  
(rows)**

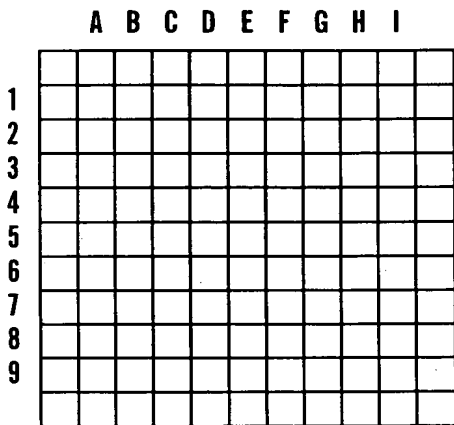
**3rd Tetramer addition  
(columns)**

**4th Tetramer addition  
(rows)**

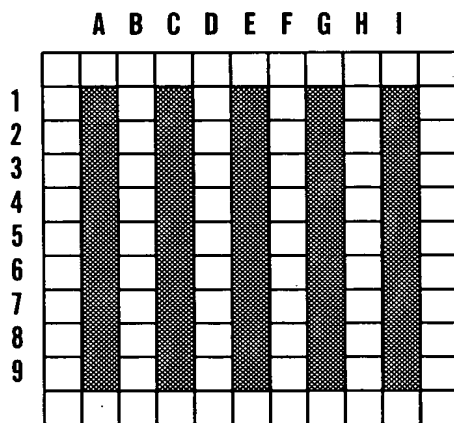
**5th Tetramer addition  
(columns)**

**6th Tetramer addition  
(rows)**

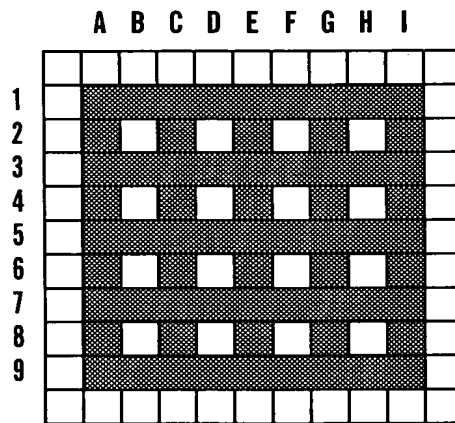
### Addressable array with full length PNA 24mers



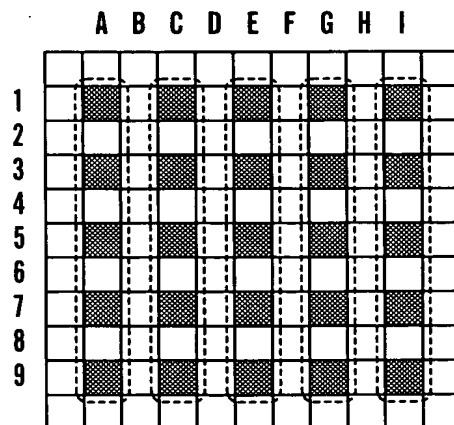
**FIG. 19A**



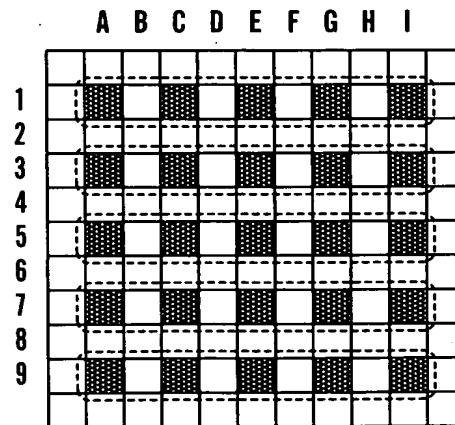
**FIG. 19B**



**FIG. 19C**



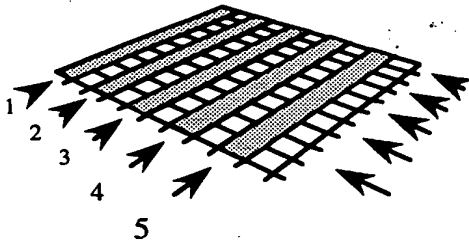
**FIG. 19D**



**FIG. 19E**

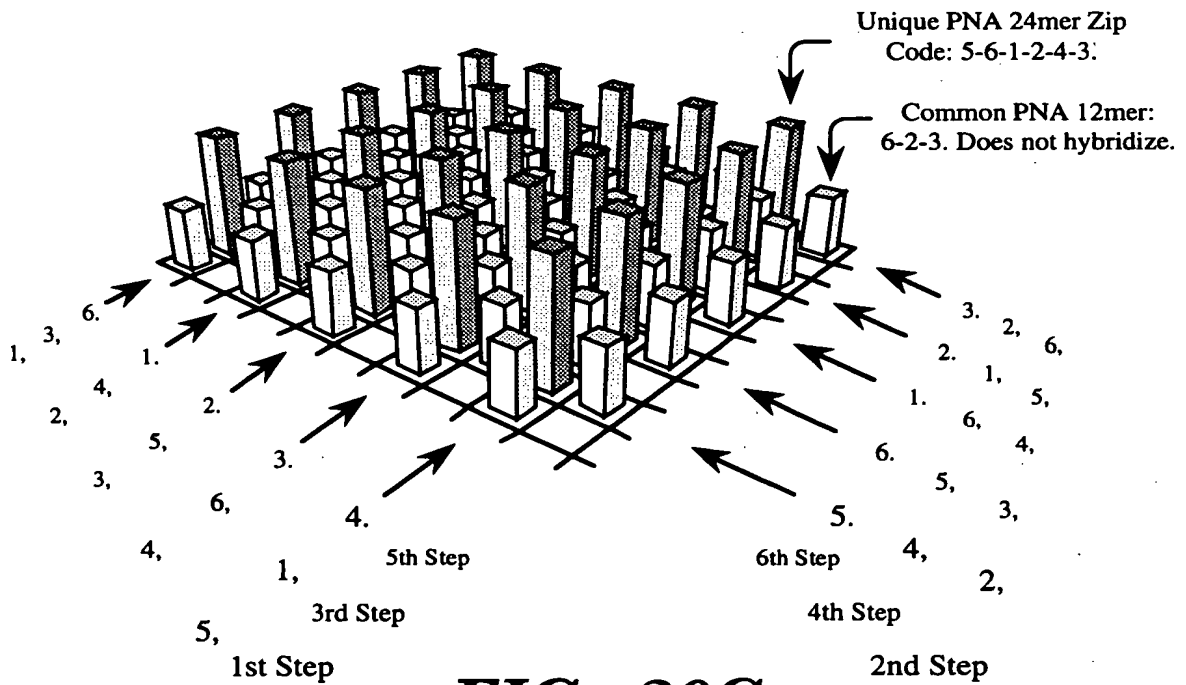
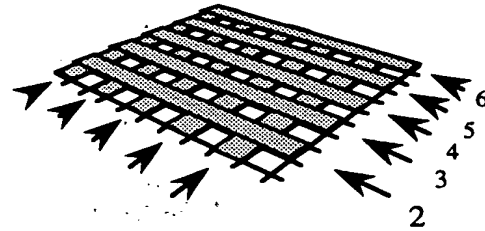
**FIG. 20A**

1st Tetramer additions  
(columns)




**FIG. 20B**

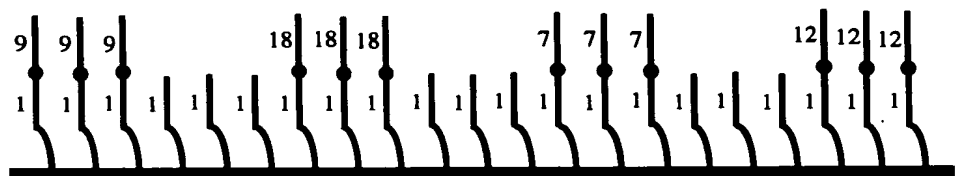
2nd Tetramer additions  
(rows)

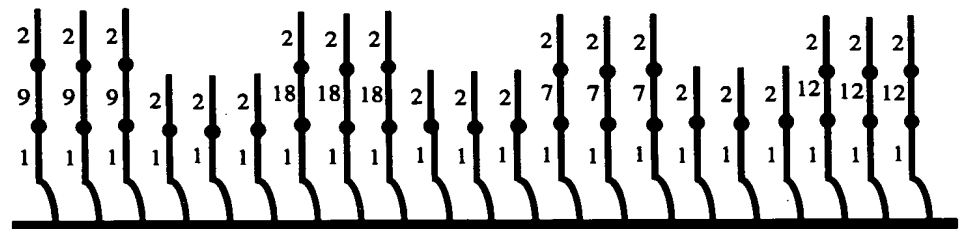


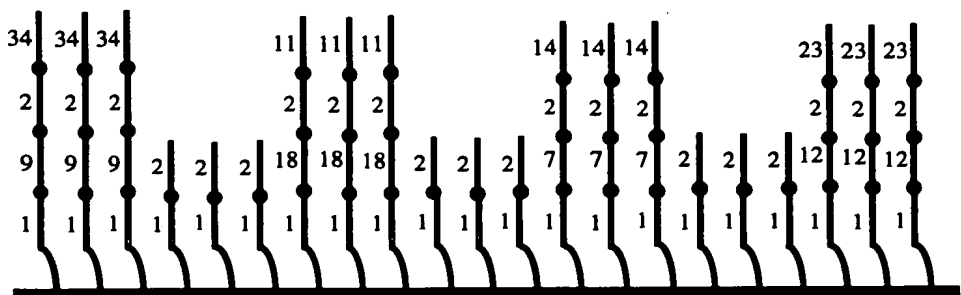
**FIG. 20C**

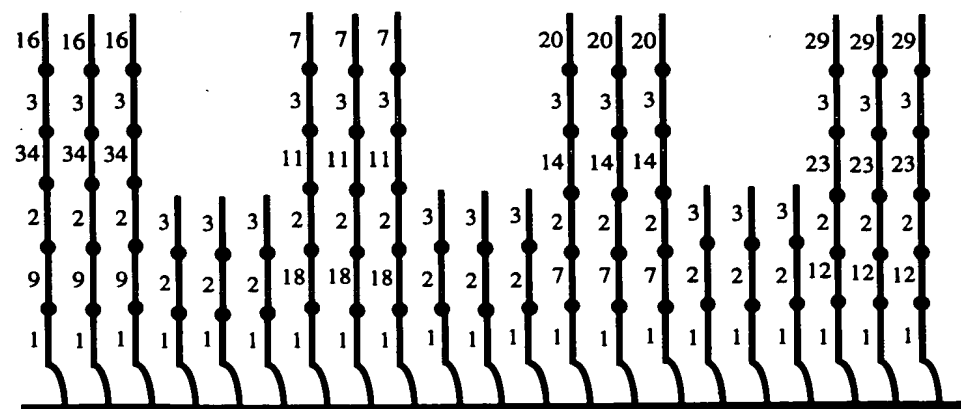
**FIG. 21A** 

**FIG. 21B** 

**FIG. 21C** 

**FIG. 21D** 

**FIG. 21E** 

**FIG. 21F** 

22B FIG. 22A

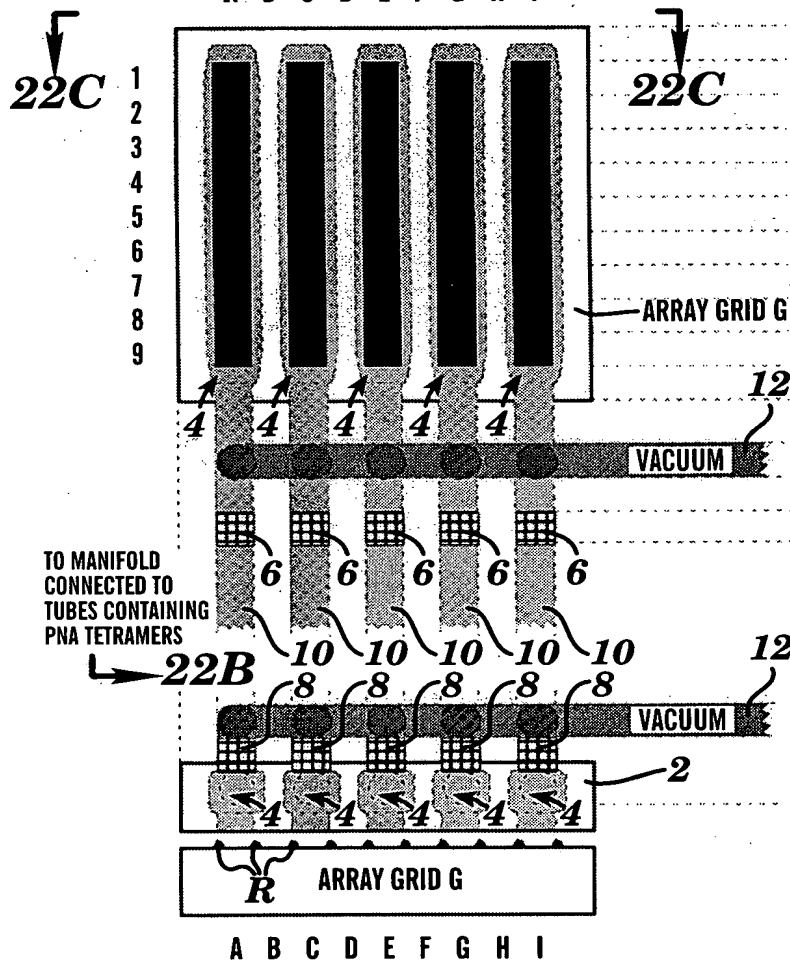


FIG. 22C

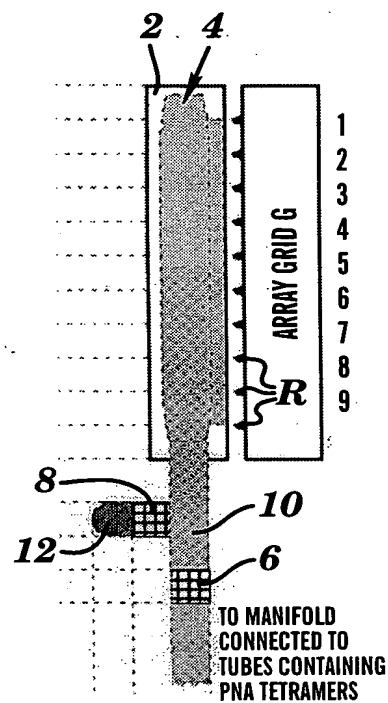
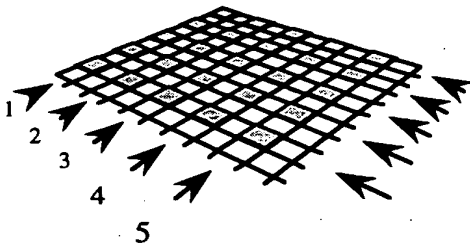


FIG. 22B

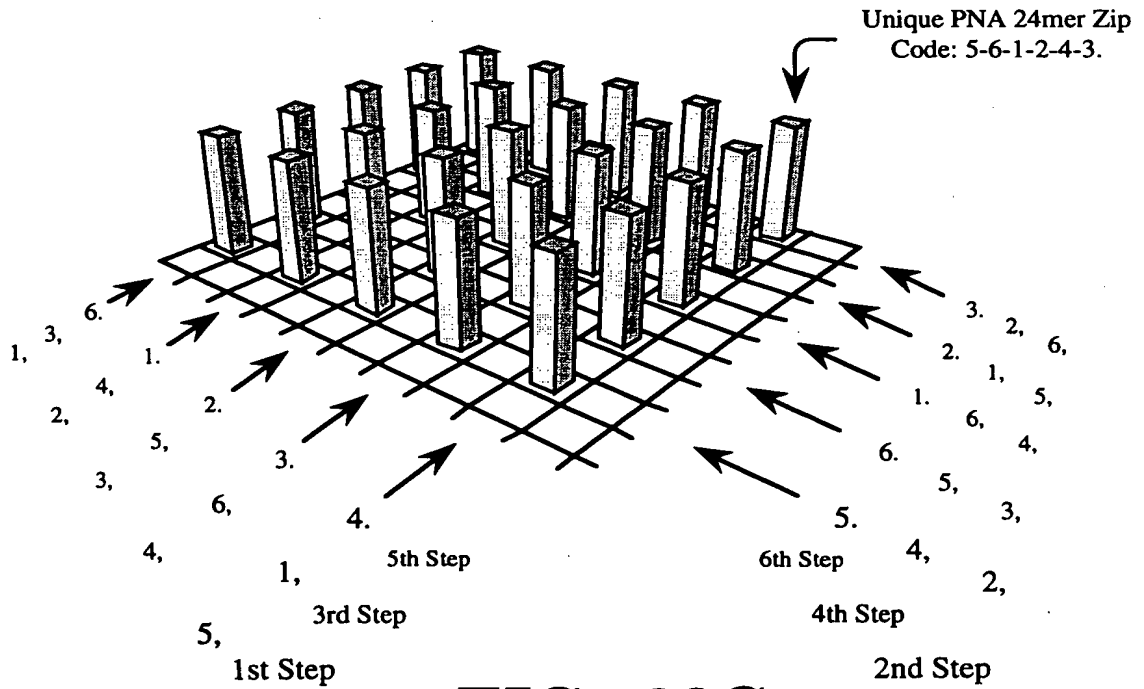
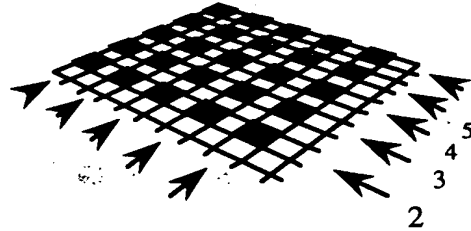
**FIG. 23A**

1st Tetramer additions  
(columns)



**FIG. 23B**

2nd Tetramer additions  
(rows)



**FIG. 23C**

24B FIG. 24A

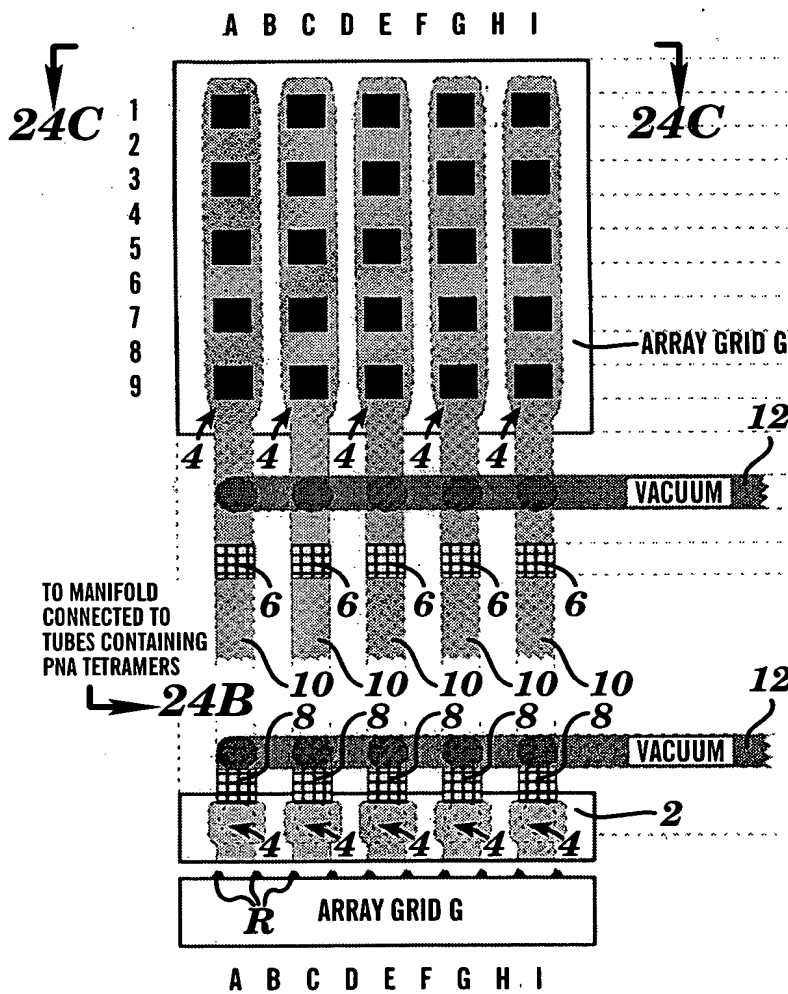


FIG. 24C

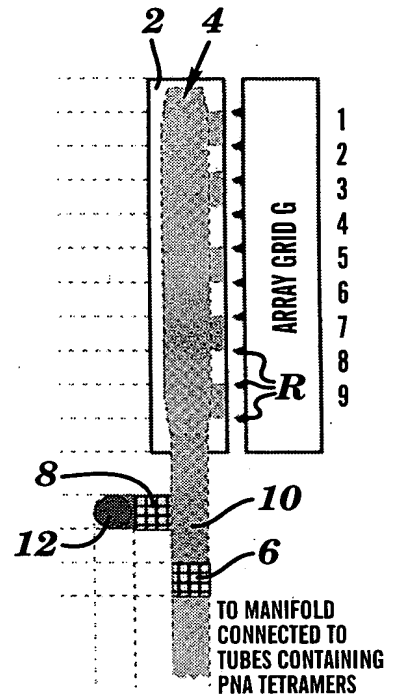
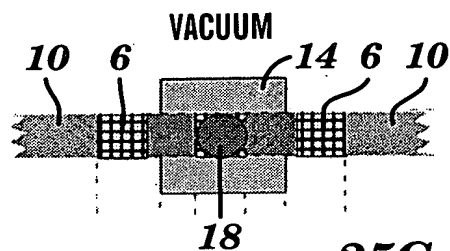
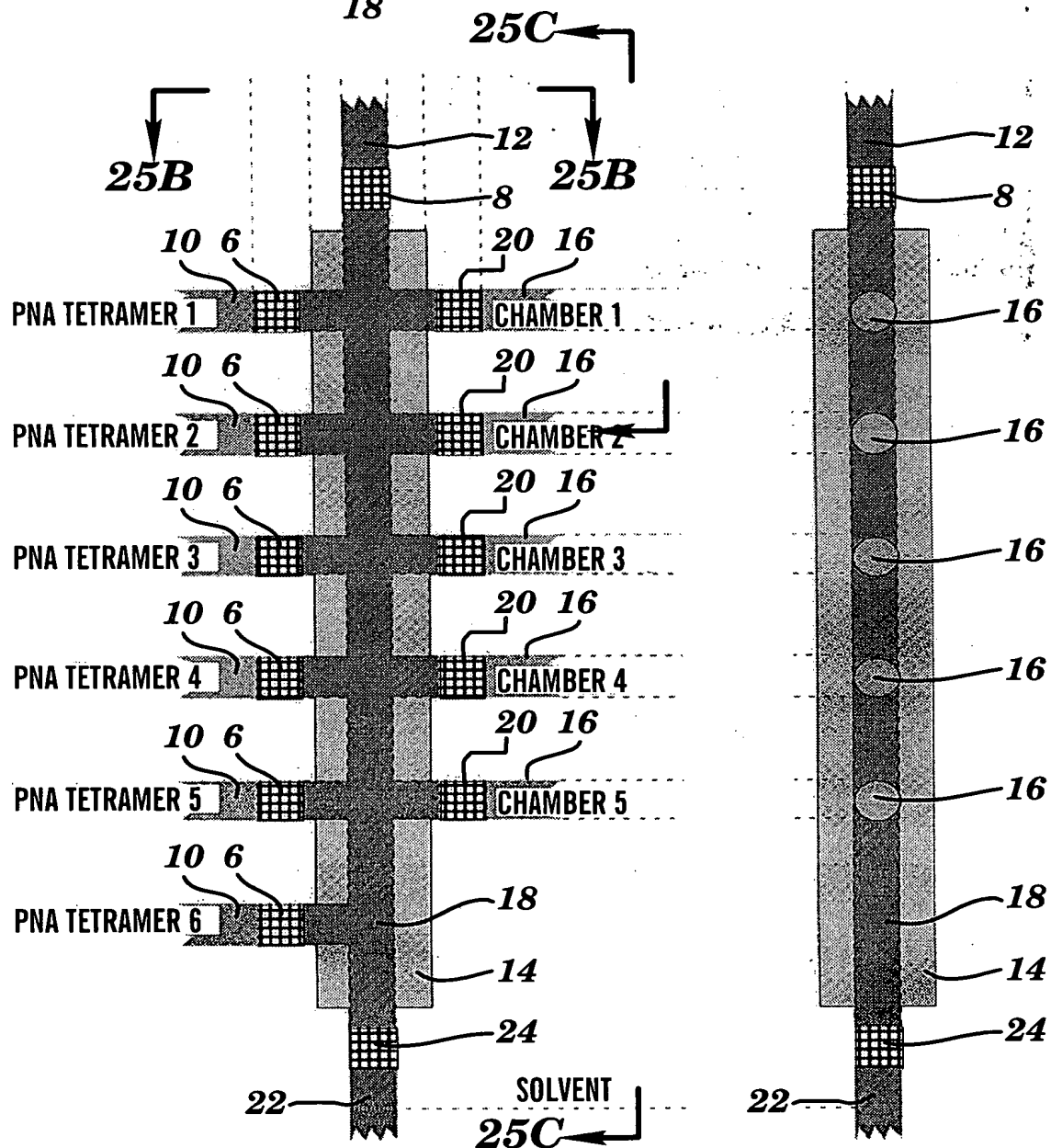


FIG. 24B

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**FIG. 25B**

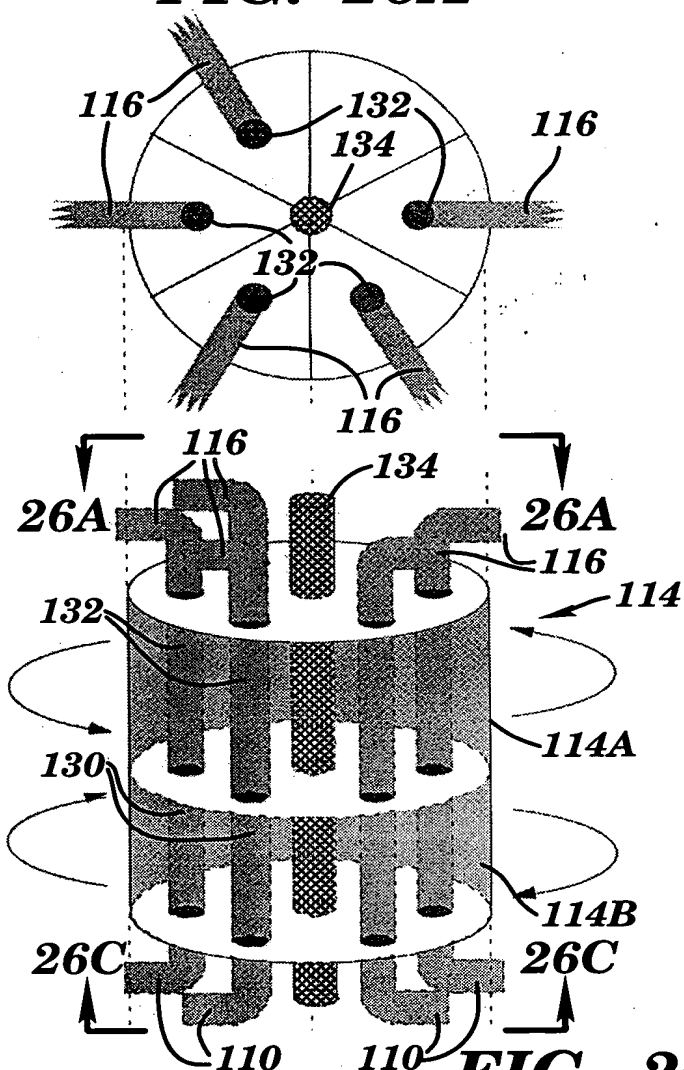


**FIG. 25A**

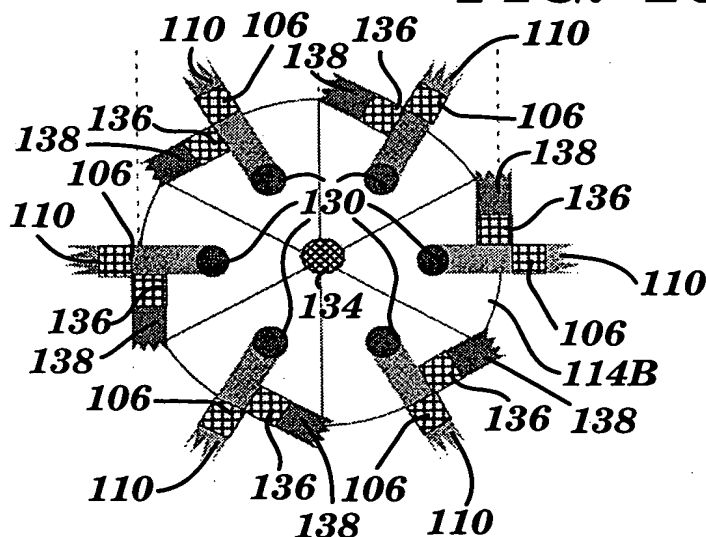
**FIG. 25C**

## 6 INPUTS AND 5 OUTPUTS

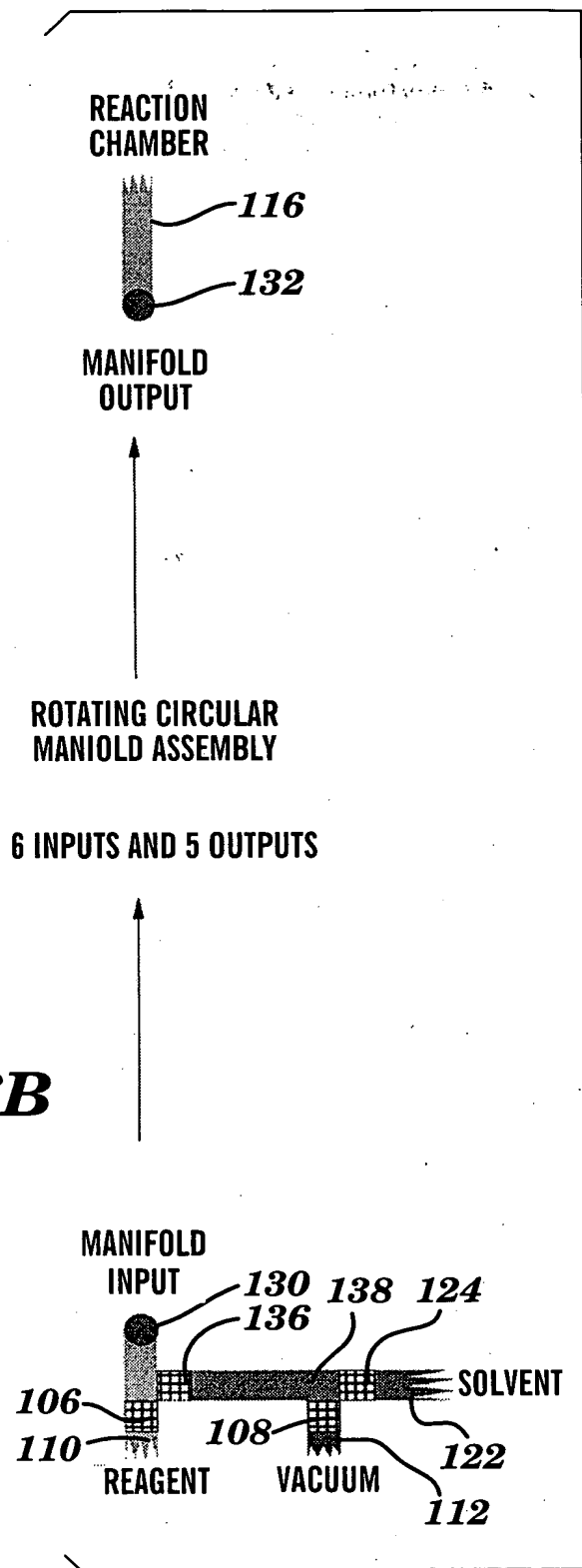
**FIG. 26A** 26/34



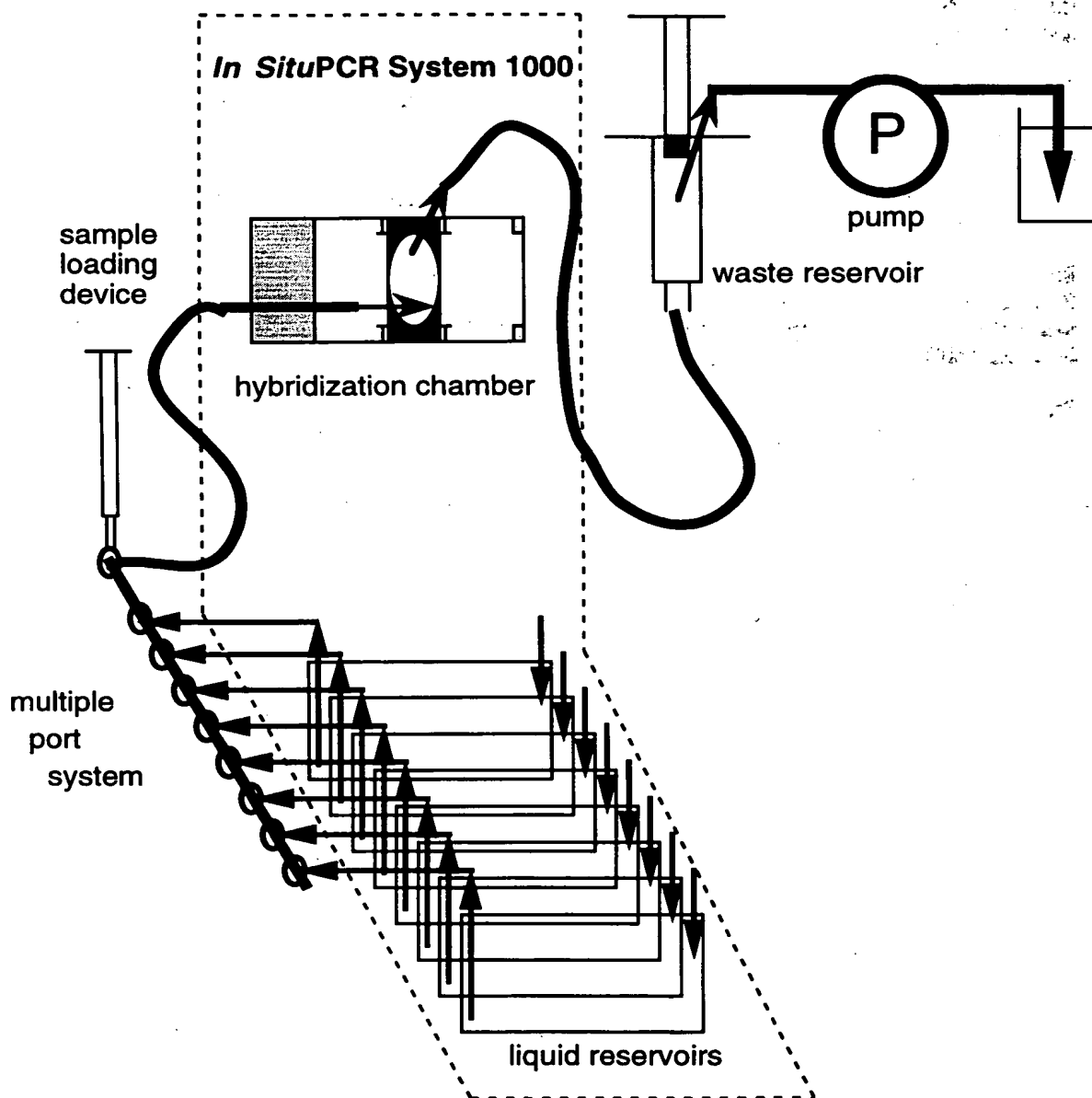
**FIG. 26B**



**FIG. 26C**



**FIG. 26D**

**FIG. 27**

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-COOH; PROBE 12

-COOH; PROBE 14

-NH<sub>2</sub>; PROBE 12

-NH<sub>2</sub>; PROBE 14

**FIG. 28**

T09260" 869E9660

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2% EGDMA

2% HDDMA

4% EGDMA

***FIG. 29***

109250" 869E960

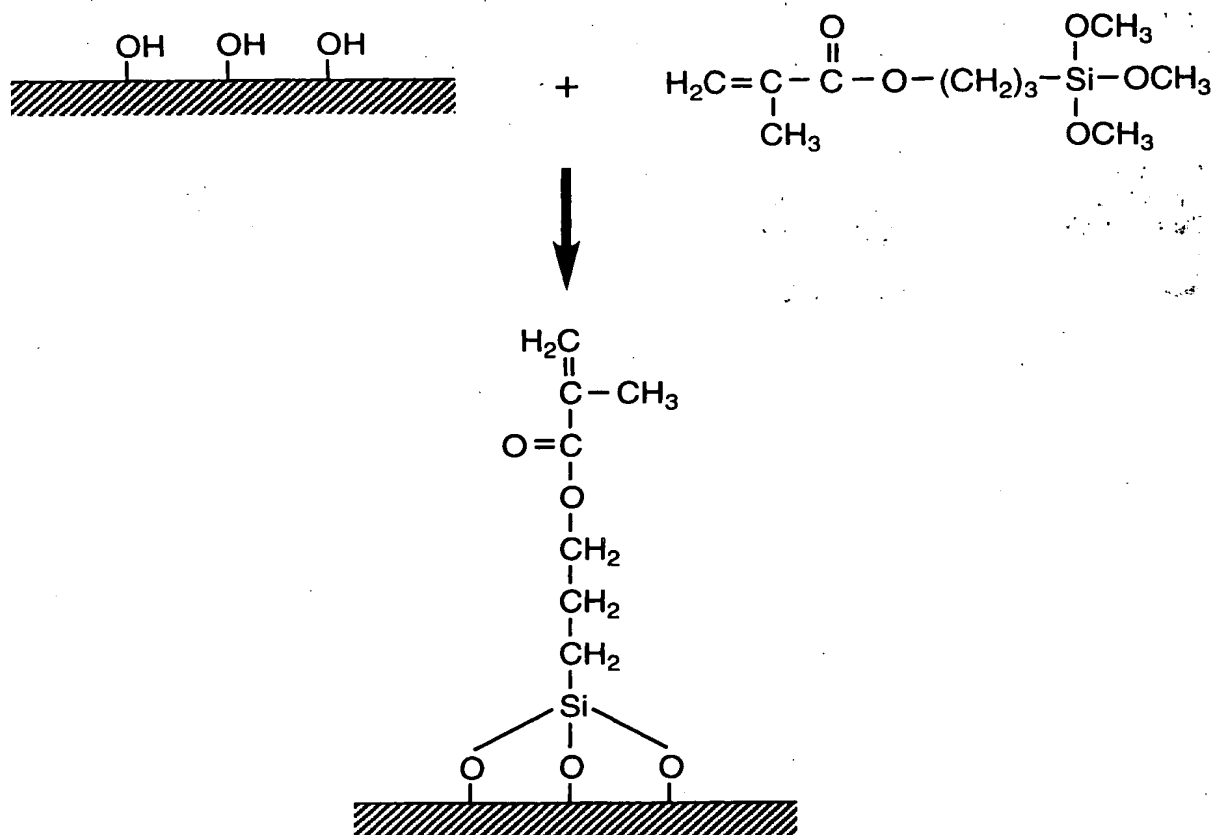
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1 ●  
2 ●

***FIG. 30***

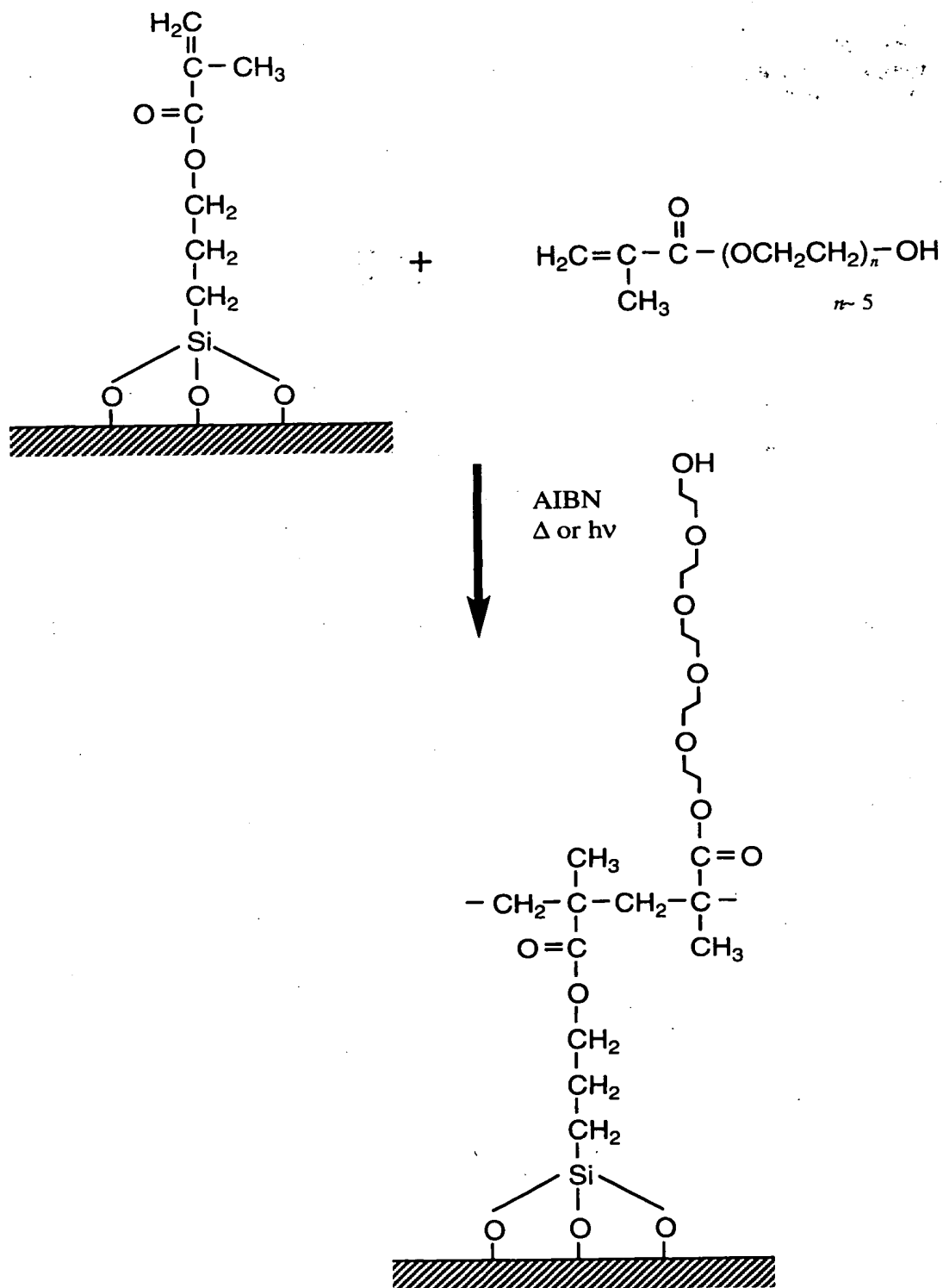
T09260" B69E9660

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**FIG. 31**

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**FIG. 32**

109260 869E9660

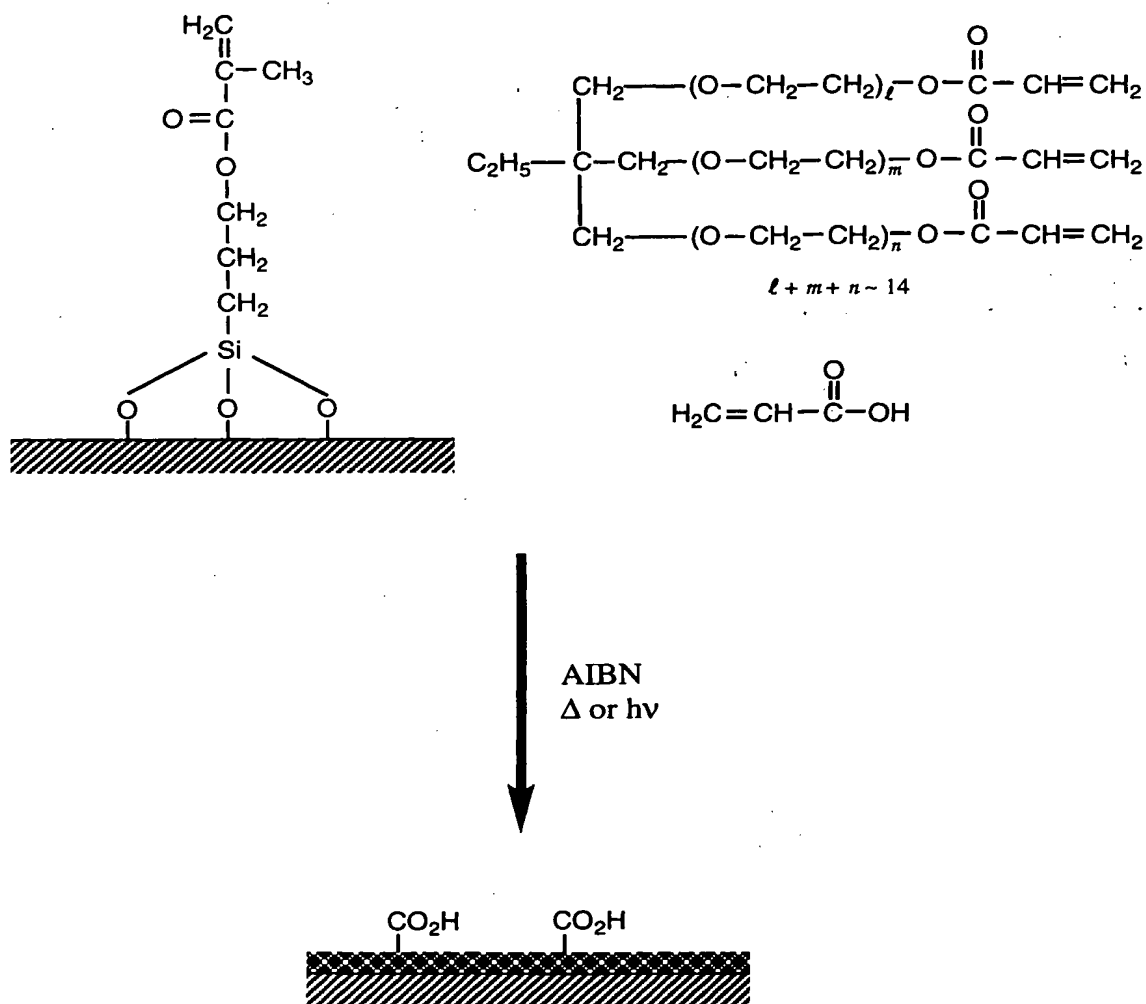
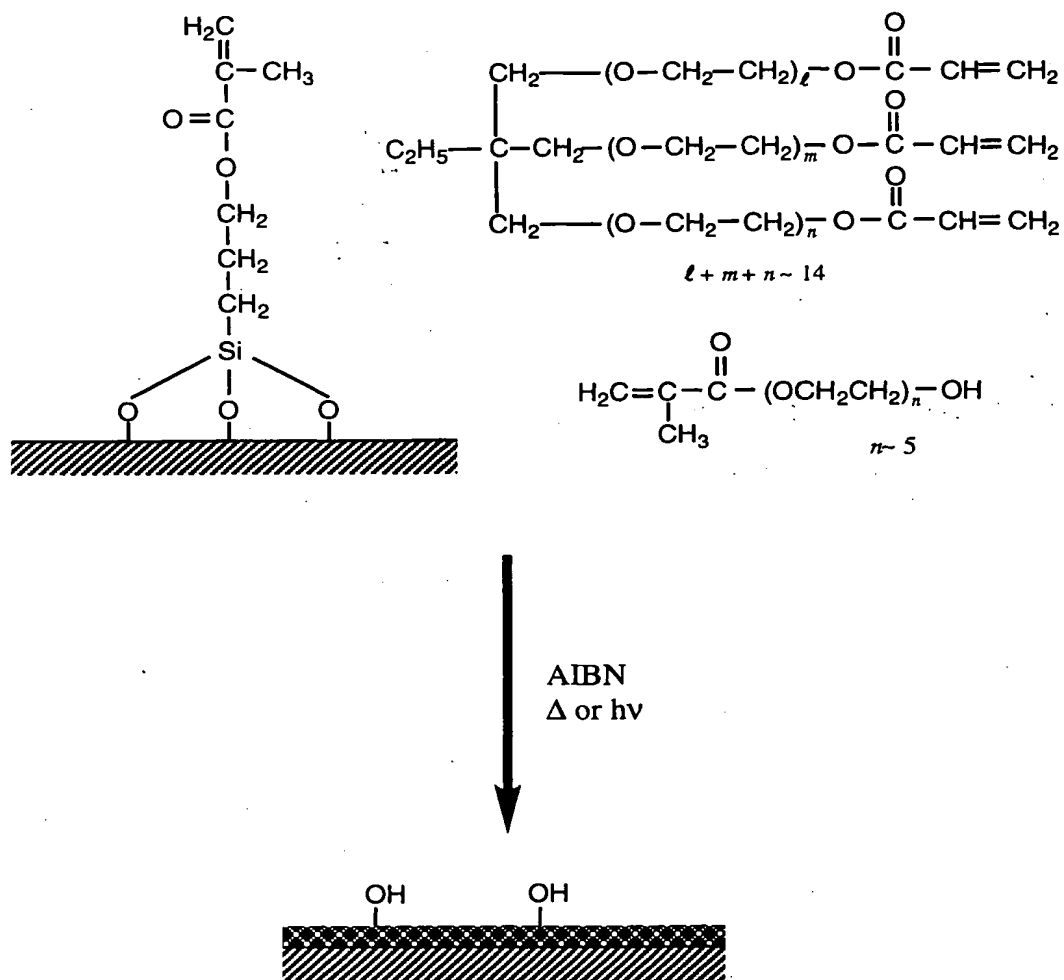


FIG. 33

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**FIG. 34**